

Biological Opinion for TE-065406-0

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion regarding the issuance of an Endangered Species Act of 1973, as amended, (Act) Section 10(a)(1)(B) permit. The federal action under consideration is the issuance of a permit authorizing the incidental take of the federally listed endangered Houston toad (*Bufo houstonensis*) under the authority of sections 10(a)(1)(B) and 10(a)(2) of the Act. Boy Scouts of America, Capitol Area Council No. 564 (BSA/CAC) has submitted an application for an incidental take permit under the Act for take of the Houston toad. An Environmental Assessment/Habitat Conservation Plan (EA/HCP) has been reviewed for mitigation acceptability. The implementing regulations for Section 10(a)(1)(B) of the Act, as provided for by 50 CFR 17.22, specify the criteria by which a permit allowing the incidental "take" of listed endangered species pursuant to otherwise lawful activities may be obtained. The purpose and need for the Section 10(a)(1)(B) permit is to ensure that incidental take resulting from the proposed construction and operation of a "High Adventure" camp on the 4,848-acre Griffith League Ranch in Bastrop County, Texas, will be minimized and mitigated to the maximum extent practicable, and that the take is not expected to appreciably reduce the likelihood of the survival and recovery of this federally listed endangered species in the wild or adversely modify or destroy its federally designated critical habitat.

The two federally listed species identified within this EA/HCP include the endangered Houston toad (and its designated critical habitat) and the threatened bald eagle (*Haliaeetus leucocephalus*). The bald eagle, proposed for delisting on July 4, 1999, is a regular migrant and winter resident in the eastern half of Texas and is usually associated with large bodies of water. In Bastrop County, bald eagles feed and nest along the Colorado River. The Service has concluded that no effect on the bald eagle is anticipated as a result of the proposed action because it is not in the area, and thus, it will not be considered further in this consultation.

This biological opinion is based on information provided in the BSA/CAC's EA/HCP, Houston Toad Recovery Plan (USFWS 1984), field reviews, expert reports, and other sources of information. A complete administrative record of this consultation is on file at the Austin, Texas, field office.

Consultation History

On October 30, 2003, BSA/CAC submitted an application for an incidental take permit under section 10(a)(1)(B) of the Act. The availability of this application along with the EA/HCP was published in the *Federal Register* on December 16, 2002. The 60-day public comment period closed on February 14, 2003. Comments were addressed in the BSA/CAC's EA/HCP where appropriate.

BIOLOGICAL OPINION

Description of Proposed Action

The action involves issuance of a section 10(a)(1)(B) permit for 50 years to BSA/CAC for construction and operation of a “High Adventure” camp on the 4,848-acre Griffith League Ranch in Bastrop County, Texas (Figure 1).

At peak operation during the months of June, July and August, about 720 Scouts and Scout leaders will visit the camp each week for one-week experiences. Weekend and weekday use during other times of the year will probably not exceed 100 persons per day, such use confined mostly to the conference center/base camp area. This projected rate of use equates to 62,540 user-days and 35,120 user-nights per year, or 97,660 total visits annually. Some 48 percent (30,240) of the day-use visits and 72 percent (25,920) of the projected overnight visits will occur during the six-week summer scouting season in June and July.

The proposed high impact development (Figure 2) will involve the construction and use over the life of the permit of 4,330 feet of a 18-foot wide all-weather entrance road, a 2,300 square-foot office/residence, a 7,920 square-foot stable, a 400 square-foot blacksmith shop, a 1,800 square-foot residence, three lakes covering up to 360 acres, a 5,000 square-foot conference center, a 2,000 square-foot computer lab, six 2,000 square-foot dormitories, a two-acre parking lot, a 3,500 square-foot headquarters building, a 4,000 square-foot museum, two 400-foot beaches, a three-hole 34-acre golf course, a fire station, and 12 program areas (Table 1). Four hundred twenty-two (422) acres of this development will be in Houston toad woodland habitat and 76 acres of pasture. No known ponds will be eliminated as a result of the proposed development except Pond 4, at which no Houston toad breeding is known to occur. Only Lake 1 (196 acres), the Base Camp dormitories and restrooms (seven acres), and the Fort St. Louis program area buildings (10 acres) will be constructed during the first phase of development. Sport fish would likely be stocked in the lake. The lake will be filled slowly to allow any toads in the area to escape and then monitored to assess any impacts to the Houston toad population. Future lakes, if constructed, will be designed to avoid impacts based on what is learned from the impacts of Lake 1. No known breeding ponds will be affected by the construction of the lakes. Except for the lake, the first phase high impact construction will be located in cleared pasture areas not known to be occupied by the toad. Additional program areas will be developed as funds become available. Meanwhile, the impacts of the initial development on the Houston toad population will be monitored, and adjustments will be made as necessary to avoid a decrease in the population due to a BSA/CAC’s project. Roadways will be monitored for mortalities, and accommodations, such as the installation of drift fences, will be made to reduce or eliminate the causes.

Moderate impact activities consisting of the construction and use of campsites, activity areas, and horse and biking trails will occur on 338 acres of woodland habitat and 78 acres of pasture. During the first phase, 147 acres for the Base Camp campsites, the open-air chapel, the shoots range, the COPE course, horse trail, fencing and the Fort St. Louis campsite will be developed.

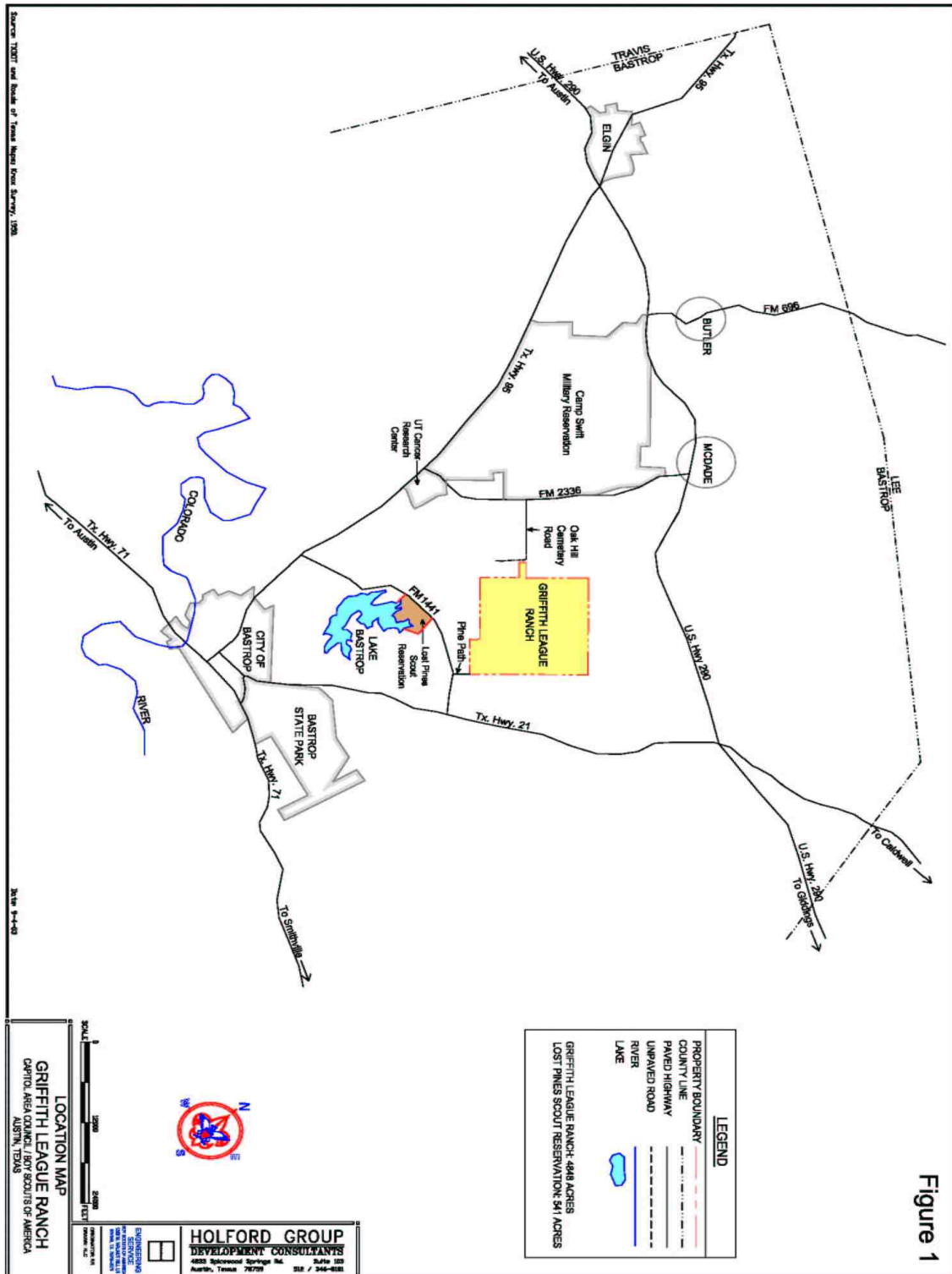


Table 1 ANALYSIS OF DISTURBANCE: PREFERRED ALTERNATIVE

Project	Type of Development	Disturbance Level	Acres (approximate)			Percent of Area (approximate)		
			Woodland	Cleared Pasture	Total	Woodland	Cleared Pasture	Total
Total Acres			4283	565	4848	88	12	100
						Percent of Each Vegetation Type		
						Woodland	Cleared Pasture	Total
Entrance Complex	Ranger Residence, including driveway	High		2	2		<1	<0.1
	Corral, Blacksmith and Stables Area	High		18	18		3	<1
	Main Roadway, 40 ft. Corridor	High		5	5		1	<1
	Main Gateway, Wrangler's Quarters	High		1	1		<1	<0.1
	Fenced Pasture	Low		40	40		7	1
	Hayfield	Low		200	200		35	4
	Chisholm Trail Group Campsite	Moderate	9		9	<1		<1
Subtotal			9	266	275	<1	47	6
Conference Center/Base Camp Complex	Conference Center, Ranch Headquarters, Museum, Computer Lab, Dormitories, Parking Lot, Wastewater Treatment Plant	High	5	8	13	<1	1	<1
	Golf Course	High		34	34		6	1
	Chapel, open air	Moderate	1		1	<0.1		<0.1
	Rifle, Pistol, Shotgun, Archery Ranges	Moderate	15		15	<1		<1
	Five basecamp pods	Moderate	15		15	<1		<1
	Two Basecamp Restroom/Shower Buildings, including Septic	High	2		2	<0.1		<0.1
	Two Beach Areas	High	1		1	<0.1		<0.1
Subtotal			39	42	81	1	7	2
COPE Area	COPE Course	Moderate	20		20	0		<1

Foot Trails	8 ft. Corridor (43,556 lin. Ft., 8.25 mi.; 0.183 ac/1,000 ft.)	Moderate	8		8	<1		<1
Horse Trail	20 ft. Corridor (78,408 lin. Ft., 14.8 mi., 0.433 ac/1,000 ft.)	Moderate	30	6	36	1	1	1
	Restroom/Shower Building, including Septic	High		1	1		<1	<.01
	Overnight Campsite	Low	1	1	2	<0.1	<1	<.01
	Horse Pen	High		1	1		<1	<.01
Subtotal			31	9	40	1	2	8
Fire Station	Fire Station and Driveway	High	10		10	<1		<1
Service Roads	Gravel (66,429 Lin. Ft., 12.6 mi.; 0.918 ac/1,000 ft.)	Moderate	61		61	1		1
	Loop Road, between Basecamp and Shooting Ranges; ___ Ft. Corridor	Moderate	10		10	<1		<1
Subtotal			71		71	2		2
Fencing Corridors	20 Ft. Maintenance Corridor (87,120 Lin. Ft., 16.5 mi.; 0.459 ac/1,000 ft.)	Moderate	40		40	1		1
Lakes	Lake 1 (including Dam Corridor)	High	196		196	5		4
	20 ft. Corridor-Lake 1	Moderate	7		7	<1		<1
Subtotal			203		203	5		4
	Lake 2 (including 100-ft. Dam Corridor)	High	49		49	1		1
	20 ft. Corridor-Lake 2	Moderate	1		1	<0.1		<.01
Subtotal			50		50	1		1
	Lake 3 (including 100-ft. Dam Corridor)	High	104		104	2		2
	20 ft. Corridor-Lake 3	Moderate	3		3	<0.1		<0.1
Subtotal			107		107	2		2
Maintenance Area	Houses, Barn, Maintenance Shed	High		4	4		1	<1

Outdoor Learning Centers	Texan (10 acres)						
	Farm animal pens	High	<1	<1	<0.1		<0.1
	Restroom/Shower Building, including Septic	High	1	1	<0.1		<0.1
	Three 3-acres camp pods	Moderate	9	9	<1		<1
Subtotal			10	10	<1		<1
	Republic of Texas (14 acres)						
	Smokehouse	High	1	1	<0.1		<0.1
	Orchard and garden	High	3	3	<0.1		<0.1
	Restroom/Shower Building, including Septic	High	1	1	<0.1		<0.1
	Three 3-acres camp pods	Moderate	9	9	<1		<1
Subtotal			14	14	<1		<1
	Frontier Life (10 acres)						
	Sawmill	High	<1	0	<0.1		<0.1
	Restroom/Shower Building, including Septic	High	1	1	<0.1		<0.1
	Three 3-acres camp pods	Moderate	9	9	<1		<1
Subtotal			10	10	<1		<1
	Fort St. Louis (19 acres)						
	Stockade	High	2	2	<0.1		<0.1
	Trading Post	High	1	1	<0.1		<0.1
	Boat Building	High	1	1	<0.1		<0.1
	Native American Village	High	5	5	<1		1
	Restroom/Shower Building, including Septic	High	1	1	<0.1		<0.1
	Three 3-acres camp pods	Moderate	9	9	<1		<1
Subtotal			19	19	<1		<1
	Cities of Cibola (10 acres)						
	Restroom/Shower Building, including Septic	High	1	1	<0.1		<0.1
	Three 3-acres camp pods	Moderate	9	9	<1		<1
Subtotal			10	10	<1		<1
	6 Future Outdoor Learning Centers (84 acres)						
	6 Restroom/Shower Building, including Septic	High	6	6	<1		<1
	18 3-acre camp pods	Moderate	54	54	1		1
	Service roads and theme centers	High	24	24	1		0

Subtotal			84		84	2		2
Observation Towers	3 Observation Towers	High	1	2	3	<0.1	<1	<0.1
Utilities	Water, Wastewater, Electric, Telephone (outside of development footprint)	Moderate	25	72	97	1	13	2
Low Impact Use Area	"Light on Landscape" camping, dayuse	Low	3522	170	3692	82	30	76
Totals		High	422	76	498	10	13	10
		Moderate	338	78	416	8	14	9
		Low	3523	411	3934	82	73	81

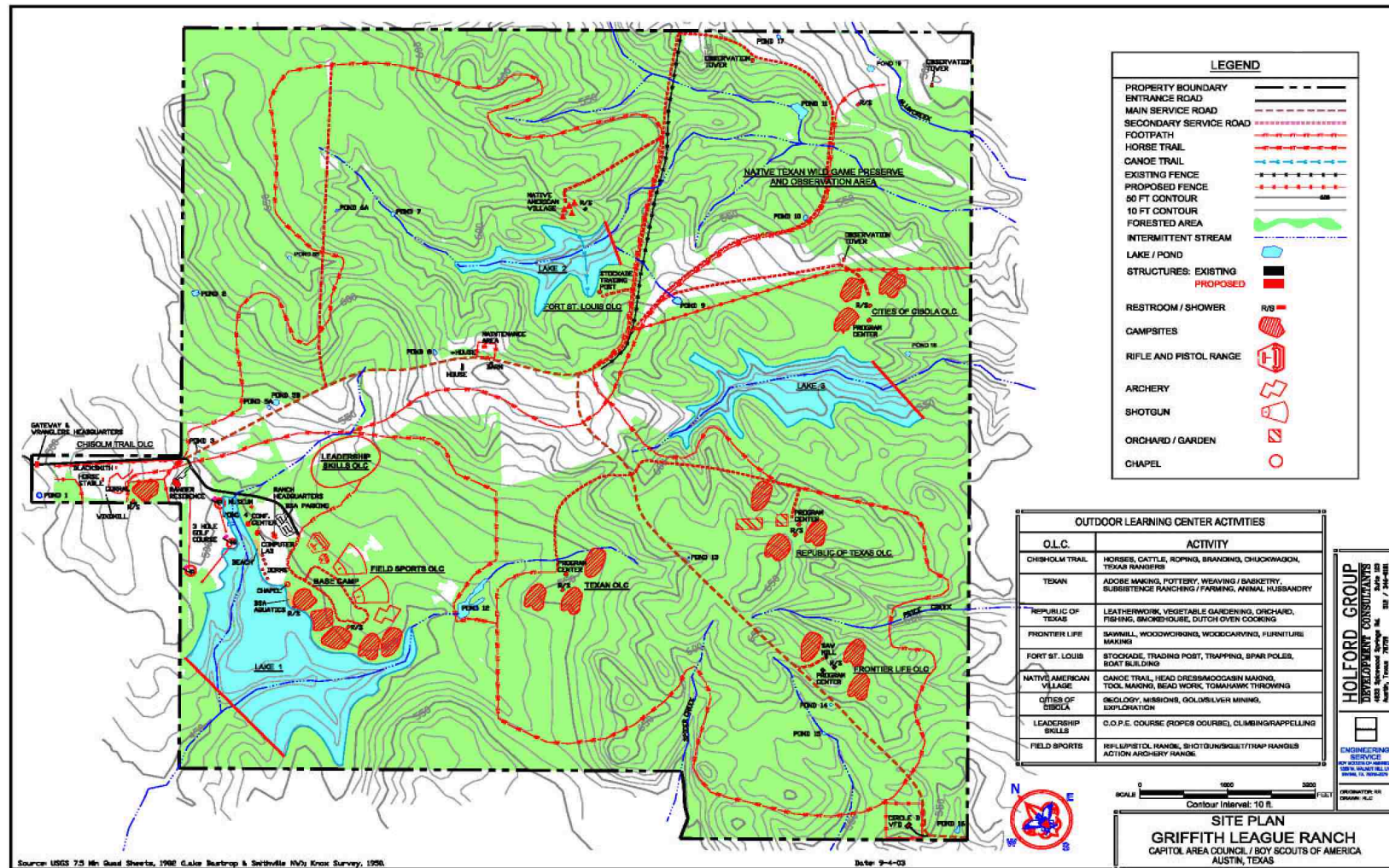


Figure 2

The impacts from the development and use of these facilities will be monitored, and adjustments to avoid or minimize impacts will be made.

Low impact hiking, backpacking, nature study, and research will occur on 3,934 acres of woodland habitat and 411 acres of pasture. The backpacking will be conducted according to the Boy Scout's "light-on-the landscape" principles. This area will also be managed for ecosystem health to benefit the Houston toad. Management actions could include prescribed fire, which, if used, will be based on information learned from prescribed burns in Bastrop State Park and approved by the Service.

To minimize and mitigate anticipated impacts on the endangered Houston toad if the Preferred Alternative is implemented, BSA/CAC will commit to managing Griffith League Ranch in such a manner as to foster a healthy and biologically diverse ecosystem and promote the long-term survival and recovery of the Houston toad. Lands will be set aside and managed by long term conservation easement (releaseable only by Service approval) on Griffith League Ranch to mitigate habitat affected by the project: one acre per acre of impact basis for high impact development and 0.6 acre per acre of impact for moderate impacts.

The BSA/CAC will impose certain restrictions on use of the ranch, such as the prohibition of commercial grazing, protection of breeding ponds, and prohibition of all but low impact use on 81 percent of the ranch. In addition, BSA/CAC will prepare several ranch management plans, including vegetation and wildlife management plans, in consultation with the Service regarding the Houston toad. These ranch management plans will specify actions that will be taken to minimize negative management impacts on the Houston toad and could include actions that would likely result in positive impacts that could lead to an increase in Houston toads on the ranch. The HCP and the other management plans will emphasize research-based adaptive management of the tract's natural resources, so that there will be no net reduction of the Houston toad population as a result of their activities.

The proposed action is further explained in detail in the BSA/CAC's EA/HCP.

STATUS OF THE SPECIES/CRITICAL HABITAT

In 1970, the Houston toad was listed as endangered (*Federal Register*, October 8, 1970) and in 1978, critical habitat was designated (*Federal Register*, January 31, 1978). The Houston toad is presently viewed as a species with a high degree of imminent threats and a high potential for recovery.

Species/Critical Habitat Description



Description. The Houston toad is one of six members of the Americanus Group, which includes Woodhouse's toad (*B. woodhousei*) and whose members range through most of North America (Forstner 2003). They are generally brown and speckled, although individual toad coloration can vary considerably. Some may appear light brown, others almost black, and they may also have a slightly reddish, yellowish, or greyish hue. Two dark bands extend down from each eye to the mouth. Their legs are also banded with darker pigment. A variable white stripe streaks along the sides of the toad's body. The underside is usually pale with small, dark spots. Males have dark throats which appear bluish when distended. Adult Houston toads are two to 3.5 inches long and, like all toads, are covered with raised patches of skin that resemble warts and two parotid glands that contain chemicals that make the toad distasteful and sometimes poisonous to predators (USFWS 1984). Although Houston toads are similar in appearance to the closely-related Gulf Coast toad (*B. valliceps*) and Woodhouse's toad, distinguishing characteristics can be discerned, and mitochondrial DNA sequence analysis indicates that the Houston toad is a unique evolutionary unit separate from the other species (Forstner and Dixon 2000).

Habitat. Houston toads are associated with forest ecosystems and sandy soils. Based on 1997 satellite imagery (U.S. Fish and Wildlife Service unpubl. data), aerial photographs, U.S. Geological Survey topographic maps, and 1977 land cover maps (Texas Department of Water Resources 1978), all of the known Houston toad populations and a historic locality in Liberty County are associated with tracts of forests dominated by pines, oaks, and other deciduous trees. Houston toad habitat consists of rolling uplands characterized by pine and/or oak woodlands underlain by deep, sandy soils. Tree species vary from one region to the next, but typically include loblolly pine (*Pinus taeda*), post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), and/or sandjack oak (*Quercus incana*). Although the Houston toad does not appear to be tied to the presence of a particular species of tree, pine is dominant in the Lost Pines forest of Bastrop County and occurs in other counties within the Houston toad's range. The Lost Pines is the most extensive stand of loblolly pines outside of the East Texas pine belt about 100 miles (160 kilometers) to the east, geographically separated by intervening prairie and savannah. Forests provide habitat partitioning that reduces competition with other toad species, cover to escape from predators and harsh climatic conditions, shade to prevent heating the sandy soils, and food supplies. Forests also provide habitat continuity needed to maintain dispersal corridors between breeding and terrestrial habitats (Laan and Verboom 1990, Rudolph and Dickson 1990, Welsh 1990, deMaynadier and Hunter 1998, Gibbs 1998, Knutson et al. 1999, Forstner 2003).

Like the loblolly pines, Houston toads are found in areas of sandy soils (no more than 20 percent clay), which form over the Sparta, Queens City, Carrizo, Willis, Weches, Reklaw, and Goliad formations (Yantis 1991, Forstner 2003). The Calvert Bluff Formation, which is a mudstone with varying amounts of sandstone, lignite, and ironstone, has not been known to be associated with Houston toad breeding locations. However, breeding ponds have been found on the Calvert Bluff in close proximity to the Carrizo Sand (Forstner 2003). These soils effectively catch

rainfall, and little is lost to runoff (Soil Conservation Service 1979). Because the Houston toad is an ectotherm and its skin is highly vulnerable to desiccation, they become dormant during harsh weather conditions, such as winter cold (hibernation) and summer heat and drought (aestivation), and seek protection by burrowing into moist sand or hiding under rocks, leaf litter, logs, or in abandoned animal burrows (TPWD 1993).

The presence of water is one of the most important limiting factors for the Houston toad. Breeding occurs in shallow, rain-fed puddles and pools that persist long enough for the eggs laid to hatch into tadpoles and metamorphose into toadlets (Hillis et al. 1984, Price 1992). Houston toads have also been documented as breeding in permanent ponds and stock tanks within suitable habitat, although stock tanks and ponds with heavily impacted margins are not used by the toads (Forstner 2001). Rainfall may stimulate breeding (Kennedy 1962, Price 1992), migration (Quinn et al. 1984) and feeding activities; prevents desiccation; and provides pools of water for reproduction.

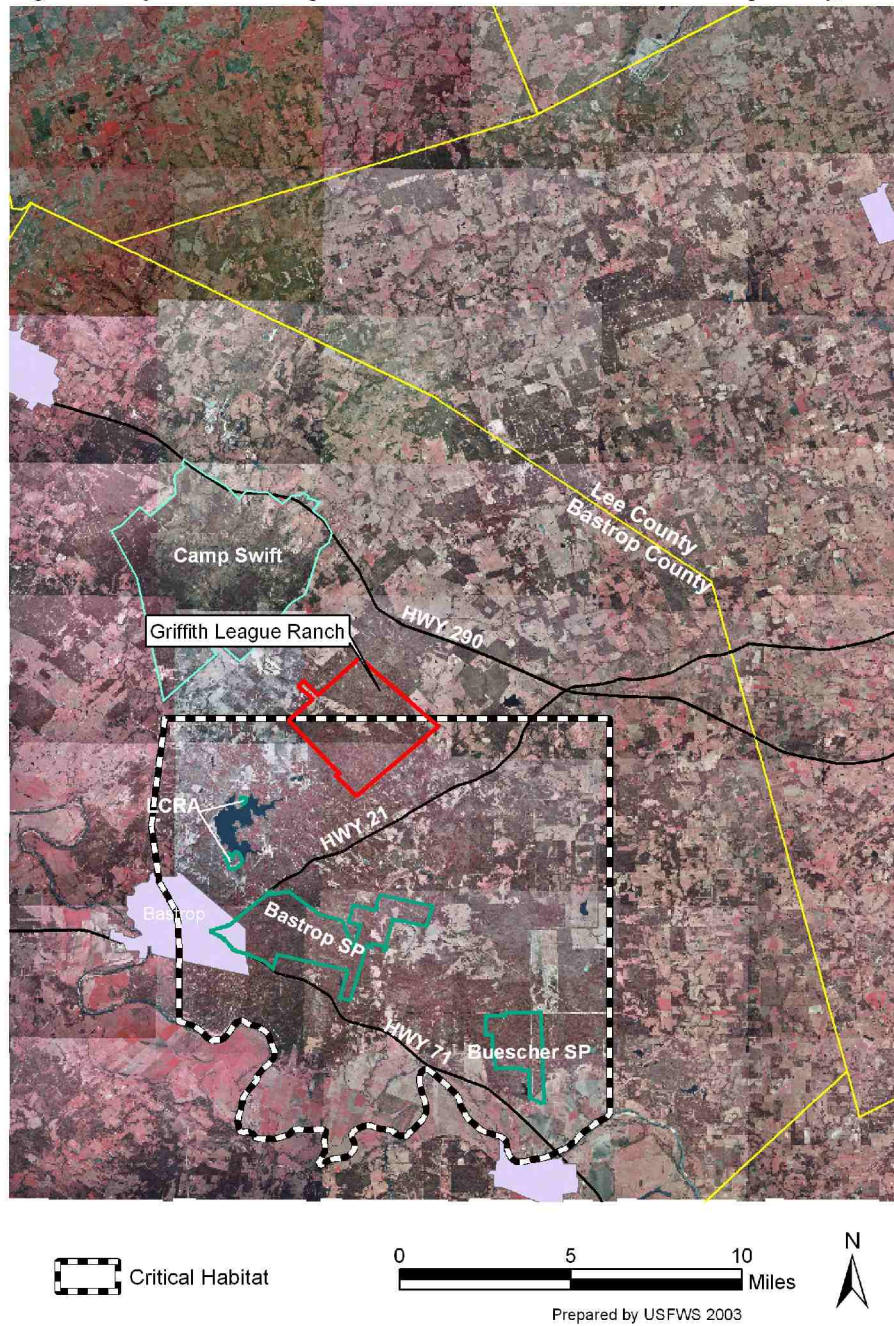
Although it ostensibly has the required habitat characteristics of woodlands and deep sandy soils, repeated search efforts by several biologists have been unsuccessful in locating Houston toads on the Camp Swift Military Reservation, located west of Highway 95 in Bastrop County (Martin et al. 1979, Dixon 1982, Espey, Huston and Associates, Inc. 1995, Forstner 2002b). The lack of Houston toads may be due to the greater clay content of the soil and lack of seeps and springs, although it is also possible that past military uses extirpated the toads (Forstner 2003).

Critical Habitat. Critical habitat includes areas that are essential to the conservation of a threatened or endangered species and that may require special management considerations or protection. Although not described when the critical habitat was designated, essential habitat requirements for the toad include seasonally-flooded breeding ponds, deep sandy soil, and forest or woodland. The Service designated critical habitat in Bastrop County (Figure 3), covering about 98,000 acres in the central portion of the county, and in Burleson County, covering about 2,000 acres surrounding Lake Woodrow, where toads were known to occur at the time. Little was known about the habitat requirements of the Houston toad at the time of designation. Since that time, more occupied Houston toad habitat has been documented in seven additional counties, and the area designated as critical habitat in Burleson County is no longer occupied. Good Houston toad habitat has been found north of the critical habitat delineation in Bastrop County and on into Lee County.

Life History

Reproduction. The life expectancy of the Houston toad is at least three years and perhaps longer (Price 1992). Males reach sexual maturity at about one year, but females require one to two years to achieve reproductive maturity (Quinn 1981). In mark-recapture surveys of Houston toads in Bastrop, observed sex ratios of males to females have been highly skewed in favor of males, ranging from 3:1 to 10:1 (Dixon et al. 1990; Forstner 2002a, 2002b, 2003). The Houston toad is an “explosive” breeder, appearing in large numbers at breeding ponds where the males call

Figure 3. Project area with respect to Houston toad critical habitat in Bastrop County, Texas



to attract females over a period of a few nights throughout the breeding season, beginning as early as January 18 (Dixon 1982). Houston toads breed from late January to June (Kennedy 1962, Hillis et al. 1984), with a peak in February and March. Large numbers of males congregate at a single location while only small numbers of individuals may appear at nearby ponds. The greater the number of chorusing males, the more likely for females to arrive at the pond. Many locations found in a recent Bastrop study failed to reach numbers likely to attract females (Forstner 2002b). Chorusing from individual ponds lasts from three to five days, but may not be synchronized with other ponds in the area. Two or three primary breeding periods separated by two to six week intervals occur at suitable ponds, and males may mate during more than one breeding episode (Hillis et al. 1984). Reported egg-laying dates in the field range from February 18 to June 26 (Kennedy 1961, Dixon 1982, Hillis et al. 1984). In Bastrop County, the earliest chorusing was January 22 and the earliest egg laying was February 18. May 2 was the latest date a gravid female was observed (Hillis et al. 1984, Forstner 2002a).

Under suitable environmental conditions, Hillis et al. (1984) observed males calling just before sunset from burrows or thick layers of pine needles along gulleys leading to the ponds and beginning to travel to the ponds. The burrows ranged from three feet (one meter) to more than 130 feet (40 meters) from the shore. After breeding, the burrows appeared to be abandoned. Females arrive later in the evening. Pairs remain in amplexus for six hours at minimum and eggs are laid in the early morning hours among vegetation or debris near the bank. Reported clutch sizes per female vary from 512 to 6,199 eggs (Kennedy 1961, Quinn and Mengden 1984, Quinn et al. 1987).

In wet years, breeding may occur wherever sufficient standing water is present. This species typically uses ephemeral rain pools for breeding, although it has been known to breed in flooded fields and permanent ponds. Presently, the most reliable breeding sites are stock ponds and similar impoundments, although in wet years breeding may occur wherever sufficient standing water is present. Unfortunately, permanent water bodies tend to have more predators, such as fish, turtles, bullfrogs (*Rana catesbeiana*), aquatic invertebrates, and snakes (Forstner 2001). For successful breeding, water must persist for at least 60 days to allow for egg hatching, tadpole maturation, and emergence of toadlets (Hillis et al. 1984, Price 1992).

During the breeding season, adult Houston toads travel between different sites within and between years. A marked adult male traveled a minimum of 4,469 feet (1,375 meters) each way back and forth between two ponds in a two-year period. Another marked individual in the same study covered 1,592 feet (490 meters) within a 24-hour period (Price 1992). Price (unpubl. data, 2001) has documented the same individually-marked male and female Houston toads using breeding ponds that are over one mile (1.6 kilometers) apart (straight-line distance) and in different watersheds. Individuals have been observed traveling up to 3,900 feet (300 meters) to breeding ponds through areas that included gravel roads, divided highways, and pastures (Dixon et al. 1990, Price 1990a, Yantis 1994).

Development rates vary depending on temperature and other factors. Eggs may hatch within seven days and tadpoles may remain in the pond for 40 to 80 days depending on environmental

conditions. Metamorphosis of tadpoles in a given pond generally occurs at the same time over a period of a few hours, resulting in postmetamorphic aggregations of toadlets that remain at the edge of the pond for seven to ten days or more (Hillis et al. 1984, Dixon et al. 1990, Forstner 2002a). Hillis et al. (1984) observed large numbers of toadlets moving as far as 330 feet (100 meters) in daylight from their natal ponds along the same gulleys used by adult toads during the breeding season. Mortality in young is extremely high due to predation and drying of breeding sites, and less than one percent of eggs laid are believed to survive to adulthood (Quinn 1981, Price 1992, Forstner 2002a, 2002b, 2003). On the Griffith League Ranch, Forstner noted that only three out of eleven ponds that had had successful breeding also had successful emergence of toadlets. Therefore, successful chorusing may not mean successful breeding.

Dispersal. Many amphibians occupy upland sites at substantial distances from the nearest breeding pond, and members of the *Bufo* genus are among the most terrestrial anurans. They live on land following metamorphosis and return to water only briefly during the breeding season (Christein and Taylor 1978). Houston toads may range widely throughout upland habitats (Price 1992, 1990a; Dixon et al. 1990; Yantis 1994). Breeding is often followed by aestivation, but toads are known to emerge and be active at other times (Dodd and Cade 1998, Dixon et al. 1990, Dronen 1991, Forstner 2002a). Although Houston toads are known to be active during the nonbreeding season, because of the toad's secretive nature, little is known about its distribution and activities during this period. Toads, especially first year toadlets and juveniles, are active year-round if conditions are favorable for foraging. If conditions are not favorable in a given year, toads may not emerge at all (TPWD 1993). Dronen (1991) reported frequent captures of small Houston toads about 1.5 inches (3.8 centimeters) in body length in pitfall traps during the fall (September through early November) and late winter (late January and early February). Toads were generally captured when temperatures were mild (59 to 77°F (15 to 25°C) and following periods of rainfall. Forstner collected adults as early as December and as late as August on Griffith League Ranch. Juveniles were collected in the summer, but adults rarely. All Houston toads collected by Forstner, adults and juveniles, were collected in or within 162 feet (50 meters) of forest habitat despite placing arrays throughout the pasture areas. In contrast to breeding season movements where adult Houston toads may travel over a mile sometimes across inhospitable areas such as roads, gravel soils and pastures (Dixon et al. 1990, Price 1990a, Yantis 1994), Forstner concluded that outside of the breeding season they do not inhabit or cross pastures beyond 50 meters (162 feet) of the forest, and adults range a maximum of less than a mile from the ponds in which they call. Juveniles and subadults may travel farther (Forstner 2000, 2001, 2002a).

Food Habits. Algae and pollen found in permanent or ephemeral water bodies comprise important sources of food for tadpoles (Hillis et al. 1984). Adult toads are indiscriminate feeders and eat a wide variety of insects and small vertebrates (Robert Thomas, Loyola University, unpubl. data in USFWS 1984; Bragg 1960).

Threats. Small, sedentary species with restricted distributions, specialized habitat niches, and narrow climatic tolerances are particularly vulnerable to extinction (Welsh 1990, deMaynadier and Hunter 1998). The distribution of the Houston toad appears to be restricted naturally as the

result of specific habitat requirements for breeding and development. These natural restrictions make them particularly vulnerable to the negative effects of human-induced changes that result in habitat loss, degradation, and fragmentation. Threats include expanding urbanization, conversion of woodlands to agriculture, logging, mineral production, alteration of watershed drainages, wetland degradation or destruction, and other processes that contribute to loss of suitable breeding, feeding, or sheltering habitat.

Habitat Destruction and Landscape Fragmentation. Habitat conversion and fragmentation make the Houston toads more vulnerable to predation, competition, and hybridization. Removal of trees acts to exacerbate the effect of drought on a local scale by increasing heat at ground level and consequent moisture loss from the soil, which makes the deforested area unsuitable for Houston toads that need to burrow to escape desiccation (Forstner 2003). Excavation and impoundment of seasonal or ephemeral drainages creates permanent open water as opposed to ephemeral ponds and pools. Permanent water is more likely to harbor predators such as birds, mammals, snakes, turtles, fish, aquatic invertebrates, and bullfrogs (Quinn and Ferguson 1983, Dixon et al. 1990) and potential competitors such as Woodhouse's and Gulf Coast toads (Hillis et al. 1984).

Habitat disturbance also encourages the establishment and proliferation of red-imported fire ants (*Solenopsis invicta*). Fire ants are known to prey on newly-metamorphosed toadlets (Freed and Neitman 1988, Dixon et al. 1990, Forstner 2002a), as well as on the invertebrate community that is an important part of the toad's food base (TPWD 1993). Fire ants are associated with open habitats disturbed as a result of human activity (such as old fields, lawns, roadsides, ponds, and other open, sunny habitats), but are absent or rare in late succession or climax communities such as mature forest (Tschinkel 1988). Thus, maintaining large, undisturbed areas of woodlands may help control the spread of fire ants (Porter et al. 1991) and protect native ant populations (Porter et al. 1988, 1991; Suarez et al. 1998).

Paved roads, even roads less than ten feet (three meters) wide, can prevent or hinder dispersal and effectively isolate populations of some invertebrates, small mammals (Mader 1984, Mader et al. 1990), and amphibians (Van Gelder 1973, Reh and Seitz 1990, Soulé et al. 1992, Fahrig et al. 1995, Yanes et al. 1995, Findlay and Houlahan 1997, Gibbs 1998, Vos and Chardon 1998, Knutson et al. 1999). Highways can have serious demographic consequences by increasing mortality and reducing connectivity and migration among remnant habitat patches. Surveys along a five-mile stretch of Highway 21 adjacent to breeding ponds near Bastrop State Park during 1990 reported 67 percent mortality of Houston toads (12 of 18 individuals) observed in the right-of-way during the breeding season (Dixon 1990, Price 1990c).

Agricultural production may contribute to habitat loss by converting forests to pasture or cropland; draining, filling, or deepening of wetlands; and compacting the soil. Plowing, mowing, applying herbicides, pesticides and fertilizers, and disturbing aestivating toads can result in direct toad mortalities (Knutson et al. 1999, Little et al. 2002). Habitat conversion to cropland or pasture also encourages the establishment of fire ants. Livestock and hay production are common land uses throughout much of the Houston toad's range (Yantis 1989, 1991). Dense sod-forming

grasses, such as Bermuda grass (*Cynodon dactylon*), can inhibit the Houston toad's mobility (Yantis 1989). Livestock grazing is a common use of woodlands in the range of the Houston toad. Livestock can trample egg clutches, larvae, and toadlets in breeding pools, and juveniles and adult toads may be crushed by livestock. Forstner reported a dramatic return of wetland vegetation with the removal of cattle from Griffith League Ranch and an increase in breeding success (Forstner 2001).

North American literature on relationships between common forest harvesting practices and the distribution and abundance of amphibians has been summarized by deMaynadier and Hunter (1995). They found negative short-term impacts from clearcuts, variable long-term effects from other types of forest harvesting, and significant long-term effects in forest plantations.

Knutson et al. (1999) found a consistent negative association between the presence of urban land and effects across many anuran guilds. Inhospitable habitats are created through the building of roads, homesites and commercial/industrial areas, removal of natural forest, planting of exotic turf grasses, draining or degradation of breeding ponds, and application of pesticides. Urban areas provide opportunities for increased exposure to fire ants, other predators, and competitors. These factors may work synergistically with other detrimental effects of habitat fragmentation to decrease the numbers and distribution of toad populations. The loss of Houston toads from the Houston area demonstrates the toad's vulnerability to urbanization. With the establishment of the new Bergstrom International Airport and the expansion of the Austin-San Marcos metropolitan area, suburban development is expanding in the Lost Pines Houston toad habitat in Bastrop County.

Competition and Hybridization. Competitors of the Houston toad include Woodhouse's toad and the Gulf Coast toad. Hybridization with these species, which could eventually result in the loss of the Houston toad as a distinct species, has been documented. All three species are found in areas of deep, sandy soils. The Gulf Coast toad breeds later than the Houston toad, and while their breeding seasons are similar, the Woodhouse toad is found more often in open areas. Most hybrids have been found where the habitat of the Houston toad has been altered from woodlands to pasture or suburban development, allowing the invasion of the other species (Hillis et al. 1984; Yantis 1991; Forstner 2002a, 2003).

Drought. Drought conditions can have a severe effect on the Houston toad as breeding ponds fail to fill or dry up before eggs or tadpoles can metamorphose. The low numbers of chorusing males recorded recently compared to the numbers encountered in 1989-1990 may be the result of the mid-1990s drought (Price 1989-1990 unpubl. data, Forstner 2000). In combination with other threats such as land use changes and urbanization, droughts may reduce small populations to such low numbers that they are unable to recover (Forstner 2003).

Wildfire. Frequent and/or severe forest fires may be detrimental to the Houston toad, particularly for small, fragmented populations. On the other hand, periodic controlled burns may be necessary to reduce fuel loads, prevent catastrophic fires, and improve habitat conditions beneath the forest canopy (Yantis 1989, Price 1993). Although necessary to determine the short and long-

range effects of various fire regimes, little research has addressed the effects of fire on amphibians (deMaynadier and Hunter 1995).

Pesticide, Fertilizer, and Contaminant Impacts. Amphibians, particularly their eggs and larvae, are sensitive to many pollutants, such as heavy metals, certain insecticides (particularly cyclodienes, such as endosulfan, endrin, toxaphene, and dieldrin), nitrites, salts, certain organophosphates (such as parathion and malathion), and petroleum hydrocarbons (Harfenist et al. 1989, Little et al. 2002, SAIC 2003). Because of their semipermeable skin, the development of their eggs and larvae in water, and their position in the food web, amphibians are vulnerable to waterborne and airborne pollutants. Pesticides can also change the quality and quantity of amphibian food and habitat (Bishop and Pettit 1992).

Mineral Production Impacts. Oil and gas fields occur throughout much of the Houston toad's range. The installation of oil and gas wells, roadways, staging areas, and well drilling activities can result in toad mortality, habitat loss, and fragmentation. Trenching or construction in areas inhabited by aestivating toads and trapping toads in open trenches or pits can result in toad mortality, and reproduction can be disrupted by destroying breeding sites. In addition to oil and gas production, mining operations (including lignite, gravel, and sand) can also result in severe, if not total, habitat loss in areas occupied by the Houston toad. Direct mortality of Houston toads and destruction of their habitat may occur in the mine area. In addition, Dixon (1982) identified possible indirect impacts from lignite mining: dewatering may draw down surface waters and dry out the subsurface moisture which may reduce the carrying capacity of permanent surface ponds and/or ephemeral pools, and leaching of sulphur and weak carbonic acids from the mine may produce poor water quality downstream in areas used by the toad.

Population Dynamics

No reliable estimate of the total Houston toad population size is yet available. Population estimates for the Houston toad are difficult to develop because of the non-random nature of historical surveys, lack of access to private lands to conduct surveys, lack of acceptable methods to extrapolate breeding counts to the population as a whole and the difficulty in locating the toad in times other than the breeding season (Forstner 2003). Houston toad numbers in Bastrop State Park fluctuate from year to year but have shown an overall negative trend, although Price feels that the population has stabilized at a lower level than that of a decade ago (Price, unpubl. data 2000). The area experienced a severe drought in the 1990's which may have caused the decline. Forstner reported that the overall chorus sizes were "quite small" compared to historical reports.

Only 70 Houston toads were found at ponds and 95 toads trapped in herptofaunal arrays during 2002 surveys on the 4,848-acre Griffith League Ranch, which supports good habitat (Forstner 2002a). A 2002 survey in Bastrop County covering areas outside of public lands and Griffith League Ranch found a high concentration of Houston toads within low density subdivisions that occur in areas likely to be high quality Houston toad habitat (Forstner 2002b), but it is unknown to what extent the aggregations of calling males heard there resulted in successful breeding and emergence of toadlets. Past estimates of population size in Bastrop have ranged from 300 to

2,000 (Brown 1975, Seal 1994) based on data collected primarily at Bastrop State Park. Forstner (2003) made a tentative estimate of one toad per 25 acres of habitat based on recapture data on Griffith League Ranch and the State Park. However, the observed sex ratio is on the order of one male to ten females, so the effective population size may be much smaller. Nevertheless, given the high reproductive potential of females, if the threats to the survival of eggs, tadpoles and toadlets can be identified and ameliorated, the Houston toad population could rebound very quickly. The size of the populations in counties other than Bastrop is poorly known and warrants further investigation. Yantis (1991) estimated that the density of male Houston toads in their range outside of Bastrop County to be one toad per 251 acres, or a total of 2,000 to 5,000 adult male toads.

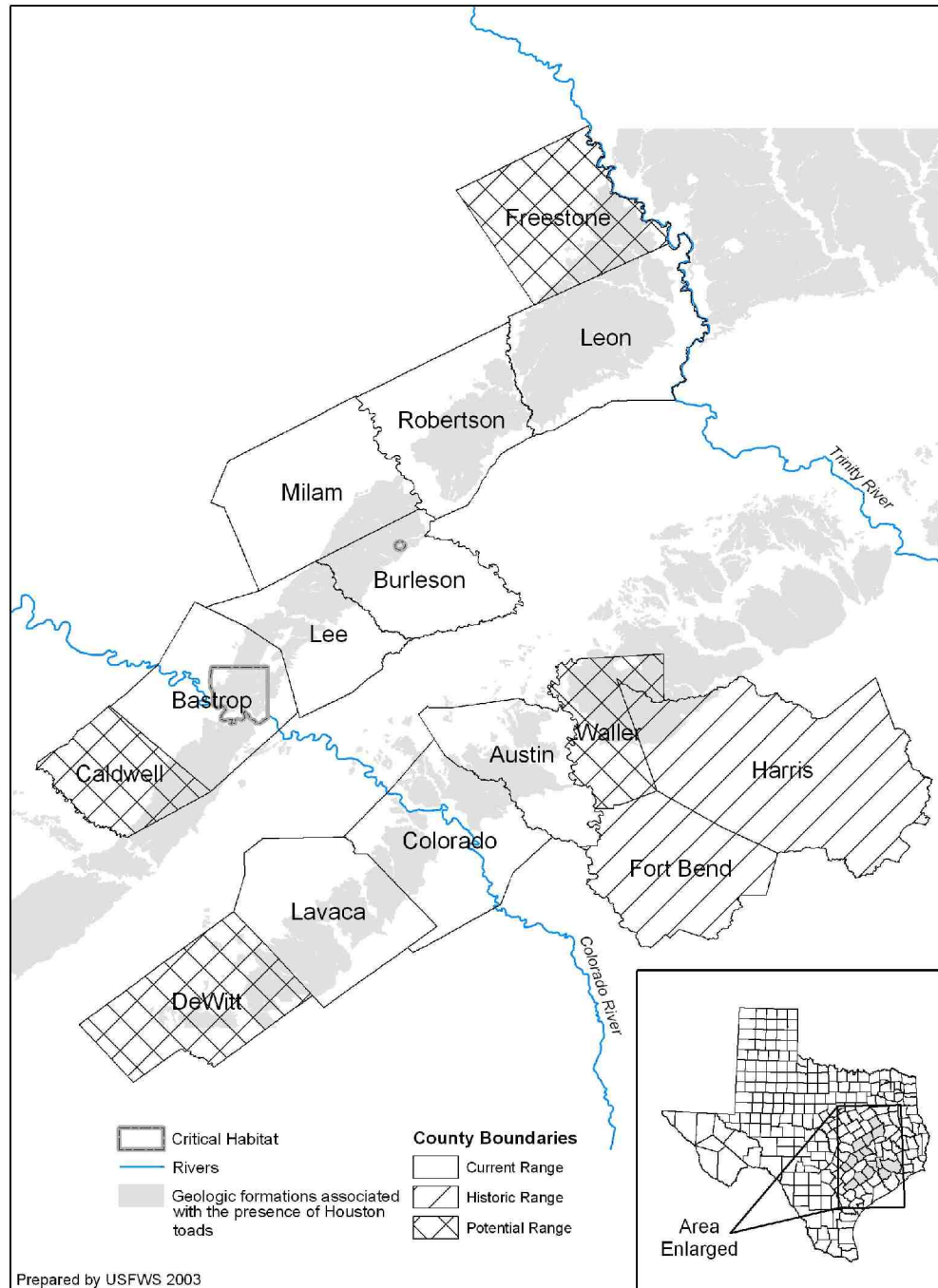
The Houston toad's population structure appears to fit the definition of a metapopulation (Soulé 1987, Marsh and Trenham 2001) because it consists of subpopulations in somewhat geographically isolated patches, interconnected through patterns of gene flow, extinction, and recolonization (Soulé 1987, Marsh and Trenham 2001). In some areas, what were once subpopulations of larger metapopulations are now apparently isolated from each other by urbanization, heavily used roads, and agriculture. Some of these changes may be reversible, allowing currently isolated populations to become part of greater metapopulations. In other cases, the changes have been so extensive that reconnection may no longer be an option. Other populations appear to be naturally isolated by riverine basins and geologic formations and may be part of separate metapopulations.

Range

Houston toad populations occur only in Texas and only along two parallel bands of geologic formations (Figure 4). One band runs through Bastrop, Lee, Burleson, Milam, Robertson, Leon, and Freestone counties and includes the Carrizo, Queen City, Reklaw, Sparta, and Weches formations. The other band runs through Austin, Colorado, and Lavaca counties and includes the Willis and Goliad formations. These geologic formations form various sandy soils, including loamy fine sands and fine sandy loams.

Houston toads are currently known to occur in Bastrop, Lee, Burleson, Milam, Robertson, Leon, Lavaca, Colorado, and Austin counties. There are also historical records from Fort Bend, Harris, and Liberty counties, but extensive surveys and documentation of the extent of habitat loss and degradation have confirmed the Houston toad's extirpation from these three counties (Hillis et al. 1984, Yantis 1989, 1990, 1991, 1992a). The only known population south of the Colorado River was found at one site in Lavaca County in 1991, but no Houston toads were heard on subsequent visits. Habitat in Lavaca County appears to be quite limited (Yantis 1991, 1992a, 1992b, 1994). Houston toads have not been found at the critical habitat site (Woodrow Lake) in Burleson County since 1983 although other populations have been found in the county (Dixon 1983, Yantis 1989, 1990, 1991, 1992a, 1992b). The Houston toad may also exist in Freestone, Dewitt, Waller and Caldwell counties based on potential habitat, but no populations have been confirmed (Yantis 1989, 1990, 1991, 1992a and pers. comm., 1995).

Figure 4. Texas counties with current, historic, or potential Houston toad habitat



The Lost Pines region of Bastrop and Lee counties continues to support the largest known, and best studied, population of Houston toads (Sanders 1953; Brown 1971; Yantis 1989, 1990, 1991, 1992a; Dixon 1982; Price 1990a, 1990b, 1990c, 1992, 1993; Forstner 2000, 2002, 2002a, 2002b, 2003). Houston toad populations have been documented both within the federally designated Bastrop County critical habitat, including the north and south shores of Lake Bastrop and low-density suburban developments, and in Lee County (Forstner 2000, 2001, 2002a, 2002b, 2003). The Bastrop Houston toad population is likely part of a larger biologically relevant population in the area bounded by the Colorado River on the south, extending well into Lee County on the north (Forstner 2003).

Analysis of the species/critical habitat likely to be affected

Because of the level of habitat fragmentation within the Bastrop/Lee County region, this area encompasses two potential artificially separate populations of Houston toads: (1) north of Highway 290 into Lee County and (2) south of Highway 290 to the Colorado River. These two areas constitute about 126,000 acres of potential Houston toad habitat in Bastrop County. Within this area, about 48 percent (~60,500 acres) of Houston toad habitat has been platted for single family housing and/or degraded in some way (converted for agricultural uses, timber harvest, commercial development, roadways).

(1) The Bastrop County pine/oak woodlands north of Highway 290 comprise approximately 27,300 acres, of which approximately 55 percent (~15,000 acres) has been cleared, platted, and/or partially developed. Most of the habitat fragmentation within this area is due to agricultural clearing practices. The same sandy soils, woodlands and underlying geology extend northeast through Lee County. However, the woodlands are much more fragmented, and the status of the Houston toad population is unknown there.

The pine/oak woodland between the Colorado River and Highway 290, the Lost Pines, supports about 98,700 acres of woodland, of which about 44 percent (~43,400 acres) has currently been cleared, platted and/or partially developed. Within the Lost Pines, only about five percent of the toads' current and former range is in public ownership. Within the Lost Pines, the existing subdivisions and roads have further fragmented the toad's habitat into approximately four remaining habitat blocks: south of Highway 71, north of Highway 21, in and around Bastrop State Park, and in and around the University of Texas (U.T.) Science Park and Buescher State Park.

(2) South of Highway 71, development activity, coupled with impacts from Highway 71 and distance from other populations, have fragmented the habitat to the extent that the ability of toads to persist in this area over the long-term is uncertain. The largest remaining habitat block south of Highway 71 is less than 1,700 acres. North of Highway 21, a block of about 8,700 acres remains undeveloped, including the 4,848-acre Griffith League Ranch. Low density subdivisions adjacent to Griffith League Ranch also support Houston toads (Forstner 2002b). Approximately 400 acres adjacent to Griffith League Ranch was recently acquired as a preserve and research station for the Houston toad. In and around the 5,500-acre Bastrop State Park, about 16,250

acres in this area remain undeveloped. About 10,450 acres remain undeveloped in and around University of Texas Science Park and Buescher State Park. However, approximately 1,500 acres in this area were partially cleared in 1997 for agricultural purposes. The U.T. Science Park and Buescher State Park total about 2,000 acres. Griffith League Ranch is located inside one of the largest Houston toad habitat blocks remaining in Bastrop County, and the ranch is known to harbor the Houston toad during all times of the year for breeding, feeding, sheltering, and/or dispersal. The project is located both inside and outside of federally designated critical habitat for the Houston toad (Figure 5). Residential development and logging are occurring in critical habitat outside of the state parks, potentially further reducing the available habitat for the Houston toad. The BSA/CAC's EA/ HCP will provide new information to better conserve and manage habitat for the Houston toad, and any take that occurs should be offset by positive conservation measures that should result in an increase in the Houston toad's breeding success.

Environmental Baseline

Under Section 7(a)(2) of the Act, when considering the effects of the action on federally listed species, the Service is required to take into consideration the environmental baseline. Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions, and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects that have undergone Section 7 consultation and the impacts of State and private actions that are contemporaneous with the consultation in progress. The environmental baseline refers to the current status, distribution, threats, and trends of the species and its habitat in the action area to define a platform to assess the effects of the action now under consultation.

The Service considers the action area to be the Griffith League Ranch. The ranch contains what has been estimated as "good" Houston toad habitat. The eastern two-thirds of the ranch is underlain by the Carrizo Sand and Reklaw geologic formations that are associated with Houston toad habitat. The western third is underlain by the Calvert Bluff formation, a formation not normally associated with Houston toad habitat but which may support some breeding habitat adjacent to the Carrizo Sand. The deep, sandy Patilo-Demona-Silstid Association soils, which support Houston toad habitat, cover 91 percent of the ranch. The Axtell-Tabor soils, which also support Houston toad habitat but may include unfavorable soils, cover most of the rest of the ranch on the western edge. Axtell soils are sandy loams ranging from fine to gravelly, and Tabor soils are sandy loam underlain by clay. Ponds 1, 3, 4 and 12 are located in the Axtell-Tabor soils. Most of the ranch is covered by loblolly pine/oak forest, but 565 acres have been cleared and planted in coastal Bermuda grass. The ranch has been in continuous use as a cattle ranch since 1838, and most of the existing ponds are old impoundments, or stock tanks, for watering cattle that trampled aquatic vegetation and churned the mud and water. Cattle were still on the ranch in 2000, but have since been removed, and already the ponds are showing improvement in water quality and vegetation. Many of the ponds hold permanent open water containing amphibians (Gulf Coast toads, Woodhouse's toads, bullfrogs, *Hyla*, *Acris*, *Rana*, *Scaphiopus*), fish (*Gambusia*, perch), reptiles (turtles, snakes), and aquatic invertebrates (Odonata). Wild hogs

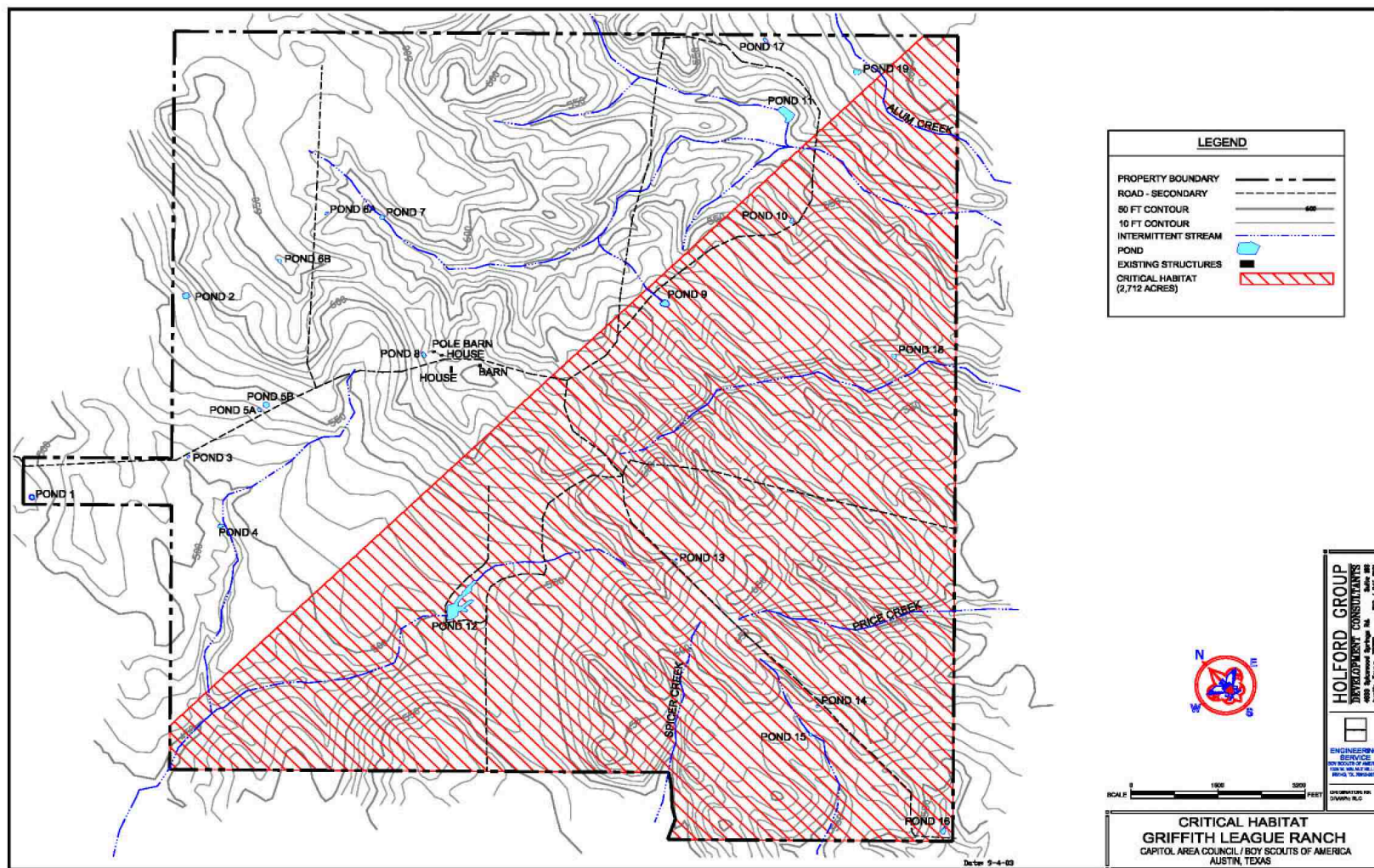


Figure 5

occur on the ranch and have created wallows on the edge of some ponds. Fire ants are present on the ranch and near the ponds. Numerous other depressions and small wetlands occur on the ranch that have not held water sufficient for breeding in recent years but could potentially hold water during wetter periods or be modified to hold water longer.

Price (1993) documented Houston toads at three ponds on Griffith League Ranch in a cursory survey in 1993. From February 7 to May 22, 2000, January 4 to April 15, 2001, and January 18 to April 9, 2002, Forstner (2000, 2001, 2002a) conducted audio surveys, mark-recapture studies, and breeding success studies for Houston toads on the ranch. He documented the species at 16 of 19 existing ponds in habitat covering almost the entire ranch. There appears to be an increase in both the number of individual male Houston toads heard and the number of chorus locations over the three years of study. This may be due, in part, to removal of livestock from the ranch and subsequent improvement in vegetative cover and water quality. The only ponds not used for breeding by Houston toads were Ponds 1, 4, and 17. Forstner theorizes that these ponds are not used because either the underlying soils are not suitable (Ponds 1 and 4) or are isolated within cleared pasture (Pond 17). In herptofaunal arrays in place from March 12, 2001, to May 28, 2002, throughout the ranch, Forstner (2002a) trapped and marked 86 adult male Houston toads and only nine adult females. Only 14 females were observed at ponds. Although the data is preliminary, Forstner theorizes that the total population on the ranch is not orders of magnitude greater because toads are already being recaptured. He estimates the population density on the ranch is on the order of one adult Houston toad per 25 acres of habitat. Most Houston toads collected outside of the breeding season were juveniles, although adults may occasionally be active under suitable conditions. Despite placing almost half of the herptofaunal arrays in pastures, Houston toads were captured only within 50 meters (162 feet) of the forest edge, indicating that the toads probably do not use the pasture areas. Gulf Coast toads have been found in most of the ponds throughout the ranch, and Woodhouse's toad has been found in three ponds, all of which are located in woodland. Forstner documented three suspected hybrids at Pond 2, which is also one of the most production Houston toad breeding ponds. As of 2002, only Ponds 2, 5, and 7 successfully produced toadlets, although Ponds 6, 8, and 10 also produced *Bufo* tadpoles, and Pond 16 had egg laying. Of these only Ponds 10 and 16 are located within designated critical habitat. While the causes of the poor reproductive success are yet to be determined, five of the non-productive ponds contained predators such as fish, turtles, or snakes, which may have had a severe negative impact.

The 2,712-acre area of Griffith League Ranch within critical habitat (approximately 56 percent) is undeveloped forested ranchland with small portions cleared for pasture. Nine ponds known to support Houston toad choruses occur within the critical habitat area, but no ponds have been documented to produce toadlets, only one produced tadpoles, and only two had known egg laying.

Forstner's research on the Griffith League Ranch is expected to continue at least through 2004. During this time he expects to collect data on the Houston toad from eggs through adults. Egg strings will be monitored to determine survival from egg to tadpole and tadpole to toadlet. Toadlets will be marked and recaptured in arrays near the pond to assess survivorship and

released. Artificial pond arrays are used to test the specific effects of factors which may affect the survivorship of tadpoles, such as slope and predation by fish and aquatic insects. Herptofaunal arrays will monitor the entire Griffith League Ranch for Houston toad activity and distribution. DNA studies are planned for future research and vegetation mapping, vegetation density and duff depths are being completed for the ranch (Forstner 2002a).

Effects of the Proposed Action

The development and use of the Griffith League Ranch Scout Camp is expected to have a range of impacts on the Houston toad. High impacts are likely to preclude the use of the affected area by the Houston toad because of direct removal of habitat, accidental mortality, and indirect effects resulting from heavy use of area. This will include building, parking lot, and improved road construction, conversion of habitat to golf course and orchard/garden, and lake construction. Moderate impacts are temporary in nature and can be remediated relatively easily, such as those caused by the creation and use of campsites, installation of utilities, creation of foot trails, and creation and use of horseback and mountain biking trails. Moderate impacts include modification of habitat, either directly or through use, which may result in reduced usage by the Houston toad and possible mortality, but are not permanent impacts to the habitat. Low impacts will be transitory in nature and not expected to result in take of any Houston toads. The low impact activities will include light day use, nature study, backpacking and overnight camping, research, and management activities.

The proposed development will have high impacts on approximately 422 acres of Houston toad woodland habitat and 76 acres of pasture (10 percent of the total acreage). No known ponds will be eliminated as a result of the proposed development except Pond 4, in which no breeding has been observed, and no direct impact on breeding success is expected. The lakes will be filled slowly to allow any toads in the area to escape and then monitored to assess any impacts to the toad population. If Houston toads use the shallow areas of the lakes for breeding, they could be subject to predation, and if the lakes attract Gulf Coast or Woodhouse's toads, there could be an increased risk of hybridization. The lakes would likely be stocked with sport fish, which could prey on Houston toads breeding near their shores. Lake 1 will be monitored to determine what impacts there may be on the Houston toad. Future lakes, if constructed, will be designed to avoid impacts based on what is learned from the impacts of Lake 1, so the net impact on the population will likely be minimal. An occasional Houston toad may be killed by heavy equipment during construction of the dams, entrance road, and buildings, or by road traffic. The improved entrance road will be monitored for mortalities, and accommodations, such as the installation of drift fences, will be made to reduce or eliminate the causes. The most of the remainder of the high impact construction, such as the conference center, residences, and golf course will be located in the cleared pasture areas not known to be occupied by the toad, and no direct impacts are expected. The golf course will be designed to require minimal levels of pesticides, herbicides, and mowing, in order to minimize risks to the Houston toads. Fire ants could be attracted to the disturbed construction and high use areas, increasing the risk of predation on the Houston toad. Any increases in the fire ant population as a result of the development would be treated.

Moderate impacts on 338 acres of habitat and 78 acres of pasture (nine percent of the total acreage) are expected to occur as a result of the construction and use of campsites, activity areas, and horse trails. The vegetation in the campsite areas and along horse biking trails, and unimproved service roads would likely be trampled and the soils compacted, which would reduce the suitability of these areas for the Houston toad. The construction of new trails, shooting ranges, chapel, and service roads could remove some trees and understory vegetation, which could have some effect on Houston toad movements. While moderate impact activities would be unlikely to cause direct mortality of Houston toads, there could be adverse indirect impacts to Houston toad habitat outside of the breeding ponds with unknown effects on the toad. The impacts on the habitat will be monitored and adjustments made to avoid or minimize impacts.

Low or no impacts are expected as a result of hiking and backpacking on 3,523 acres of woodland habitat and 411 acres of pasture (81 percent of the total acreage) where impacts are likely to be transient or temporary in nature. Given the low density of Houston toads on the ranch and the low level of use of the area, direct mortalities of toads are not expected.

Some management actions, such as prescribed burning, intended to improve Houston toad habitat and prevent the occurrence of catastrophic fire could result in some inadvertent take of the Houston toad. However, any such action taken will be based on the best scientific information available to assure that the net impact on the toad is positive. Any such actions will require Service approval. The continued removal of cattle from the breeding ponds is expected to have significant positive impacts on the pond habitat and Houston toad breeding success.

High and moderate impacts to habitat will be mitigated by preserving portions of the ranch which are supporting the most productive ponds and best woodland habitat under long term conservation easement. All impacts of the operation and development of the ranch will be monitored, and based on the monitoring and scientific research also occurring on the ranch, the activities and development on the ranch will be modified to minimize or avoid impacts to the Houston toad. The ranch will be actively managed adaptively to improve and restore the natural habitat, which should benefit the Houston toad. Already the removal of cattle has improved the quality of the breeding ponds. The BSA/CAC will monitor their impacts and manage the ranch to avoid any net reduction in the overall Houston toad population on the property. The anticipated site-specific effects of the proposed action are also described in the EA/HCP, Section 5. The permit is being applied for and the conservation actions are agreed to solely at the Applicant's discretion.

Critical Habitat. The only high impact development that will occur in designated critical habitat is the construction of Lake 3, a portion of Lake 1, the fire station, and four activity areas, totaling approximately 233 acres. This constitutes eight percent of the critical habitat on site and 0.2 percent of the critical habitat designated in Bastrop County. Moderate impacts from the theme center campsites will occur on 36 acres. Approximately, 1,973 acres of designated critical habitat could be subject to low impact use and will be managed to have little or no impact on the habitat. The proposed project will not negatively affect breeding ponds or the sandy soils, and will not have a significant impact on the forest community. The intent of the BSA/CAC is to manage the

Griffith League Ranch in a manner that will not degrade the habitat and will likely improve the habitat for the Houston toad. The most biologically productive portion of the ranch (the area containing the known ponds with breeding success) in the northern portion of the ranch, but outside of designated critical habitat, will have minimal use. Therefore, the proposed activity is not likely to significantly adversely modify critical habitat.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section, because they require separate consultation pursuant to section 7 of the Act.

Adverse cumulative effects are not likely in the action area since the BSA/CAC controls all future development and activity in the action area and there are no reasonably foreseeable significant effects on the action area from surrounding areas. The BSA/CAC is currently allowing and co-sponsoring basic research on Houston toad ecology and habitat that they plan to continue as resources permit. This in addition to the basic monitoring required by the HCP will contribute significantly to our ability to preserve and recover the Houston toad. The cumulative effects of the proposed action are also described in the EA/HCP, section 5.

Conclusion

After reviewing the current status of the Houston toad, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the issuance of a section 10(a)(1)(B) permit for fulfillment of TE-065406-0 as proposed, is not likely to jeopardize the continued existence of the Houston toad, or adversely modify or destroy critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to a listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(3)(B)(4) and section 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action (in this case granting a permit to "take" the species in

fulfillment of TE-065406-0 is not considered to be prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The proposed HCP and its associated documents clearly identify anticipated impacts to affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize these impacts. All conservation measures described in the HCP, together with any section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR Section 402.14(i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the Permittee fails to adhere to these terms and conditions, the protective coverage of the Section 10(a)(1)(B) permit and Section 7(o)(2) may lapse. The amount or extent of incidental take anticipated under the proposed HCP, associated reporting requirements, and provisions for disposition of dead or injured animals are as described in the HCP and its accompanying section 10(a)(1)(B) permit.

Extent of Take

The Service anticipates incidental take of Houston toads will be difficult to detect for the following reasons: (1) within Griffith League Ranch, the survey data for the Houston toad indicates only the presence or absence of the species at ponds during the breeding season and during dispersal, but the actual locations of toads outside of the breeding season are not known; and (2) Forstner estimated a population density of one toad per 25 acres, but the distribution of those toads and the likely areas of occupation outside of the breeding season are not known. Therefore, this opinion uses acreage of habitat as a surrogate for the quantity of take that will occur in the form of kill, harm, and harassment that may occur. Houston toads that occur on approximately 422 acres of highly impacted habitat may be killed, harmed, or harassed by the proposed camp development. About 338 acres could be moderately impacted resulting in harm to the toad, and 3,523 acres could be subject to light impacts, which would not likely result in take of the species. If a significant decline in the Houston toad population attributable to any specific action authorized by the permit is detected, the BSA/CAC will suspend that activity and alter its plans to remove the negative impact. The direct and indirect impacts are further described in the BSA/CAC's EA/HCP, Section 5. The permit is being applied for and the conservation actions are agreed to solely at the Applicant's discretion.

All Federal agencies must assure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of the constituent elements essential to the conservation of the listed species within defined critical habitats (§7(a)(2) of the Endangered Species Act, 50 CFR402, 50CFR17.94). In this biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat. The Service believes the measures included in the EA/HCP will minimize and avoid take to the maximum extent practicable and that the BSA/CAC's management of the property will provide

significant benefits to the Houston toad. No take is anticipated for any other federally listed or proposed species.

Effect of the Take

In this biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat, and that the increased management and monitoring could result in benefits to the Houston toad.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize impacts of incidental take of Houston toads:

The Service shall require that the Applicant comply with and implement the issued section 10(a)(1)(B) incidental take permit.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the following non-discretionary terms and conditions, which implement the reasonable and prudent measure described above and outline required reporting/monitoring requirements, must be complied with:

The authorization granted by the permit is subject to full and complete compliance with, and implementation of, the EA/HCP for BSA/CAC in Bastrop County, Texas, and all specific conditions contained in the permit.

The reasonable and prudent measure, with its implementing term and condition, is designed to minimize the impacts of incidental take that might otherwise result from the proposed actions. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures.

Conservation Recommendations

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend the following additional action for the listed species:

1. The Service will continue to coordinate all future section 10(a)(1)(B) mitigation activities dealing with any or all of the species involved in this action with the mitigation program of this section 10(a)(1)(B) permit.
2. The Service will promote activities that enhance the use of potential corridors needed for migration. Maintaining connections among the habitat blocks is needed to promote the long-term viability of the populations they support. Since the toad may travel overland and along drainages, migration corridors should include both upland and riparian habitats.
3. The Service will provide technical support to the BSA/CAC for their management plans, promptly review their activity plans, support their research efforts, and provide them the latest scientific information.

Reinitiation Notice

This concludes formal consultation on the issuance of a permit pursuant to section 10(a)(1)(B) of the Act to allow the incidental take of the Houston toad during and following the fulfillment of the terms and conditions of permit number TE-065406-0 in Bastrop County, Texas. As required in 50 CFR Section 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat designated not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending reinitiation.

In future correspondence concerning this project, refer to permit number TE-065406-0. Please contact Sybil Vosler at the Service's Austin Ecological Services Field Office at 512-490-0057 if you have any questions or would like to discuss any part of this biological opinion.


Regional Director, Southwest Region

11/5/12
Date

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and
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